

## **WHAT IS CLAIMED IS:**

1. A current-domain transmitter configured to receive an input signal and provide a transmitted signal, the transmitter comprising:

a plurality of elements, operatively arranged between the input signal and the transmitted signal and configured to represent the input signal with respective electric currents whose respective current magnitudes are each substantially proportional to the input signal.

2. The transmitter of Claim 1, wherein a first of the elements is:

a current mode mixer, operating completely in the current domain, configured to receive a current-domain signal representing the input signal as an electric current, and to provide an up-converted current-domain signal from which the transmitted signal is derived.

3. The transmitter of Claim 2, wherein a second of the elements is:

a current mode amplifier, operating completely in the current domain, configured to receive the up-converted current-domain signal and to output an amplified current-domain signal to a load element from which the transmitted signal is derived.

4. The transmitter of Claim 2, wherein a third of the elements is:

a current mode filter, operating completely in the current domain, configured to receive differential current signals representing the input signal, and to provide to the current mode mixer the current-domain signal representing the input signal.

5. The transmitter of Claim 4, wherein a fourth of the elements is:

a current-steering digital-to-analog converter (DAC) configured to receive the input signal and to provide the differential current signals to the current mode filter.

6. The transmitter of Claim 2, wherein the current mode mixer includes:

- a first pair of transistors configured to receive respective pairs of current signals collectively representing the current-domain signal representing the input signal; and

- a plurality of up-conversion transistors, responsive to the first pair of transistors and responsive to at least one high-frequency signal, and configured to provide the up-converted current-domain signal from which the transmitted signal is derived.

7. The transmitter of Claim 6, wherein the current mode mixer further includes:

- a second pair of transistors, operating cooperatively with the plurality of up-conversion transistors to provide the up-converted current-domain signal from which the transmitted signal is derived.

8. A current-domain transmitter configured to receive an input signal and provide a transmitted signal, the transmitter comprising:

- a current-steering digital-to-analog converter (DAC) configured to receive the input signal and to provide differential current signals representing the input signal;

- a current mode filter, configured to receive the differential current signals representing the input signal, and to provide a filtered version of the differential current signals representing the input signal;

- a current-mode up-conversion mixer configured to receive the filtered version, whose current magnitude is substantially proportional to the input signal, and to apply at least a high frequency carrier signal to an internal current-domain signal within the mixer that also has a current magnitude substantially proportional to the input signal, so as to provide a high-frequency modulated output current-domain signal whose envelope magnitude is substantially proportional to the input signal; and

- a current-mode power amplifier configured to receive the high-frequency modulated output current-domain signal and to provide an amplified high-frequency modulated output current signal from which the transmitted signal is derived.

9. The transmitter of Claim 8, wherein the current mode mixer includes:  
a first pair of transistors configured to receive respective pairs of current signals collectively representing the current-domain signal representing the input signal; and  
a plurality of up-conversion transistors, responsive to the first pair of transistors and responsive to at least one high-frequency signal, and configured to provide the up-converted current-domain signal from which the transmitted signal is derived.

10. The transmitter of Claim 9, wherein the current mode mixer further includes:  
a second pair of transistors, operating cooperatively with the plurality of up-conversion transistors to provide the up-converted current-domain signal from which the transmitted signal is derived.

11. A method of providing a transmitted signal in response to an input signal, the method comprising:

converting the input signal to an input current-domain signal whose current magnitude substantially linearly represents the input signal;

up-frequency-converting the input current-domain signal to a high-frequency current-domain signal having an envelope that substantially linearly represents the input signal; and

magnitude-amplifying the high-frequency current-domain signal to provide a signal from which the transmitted signal is derived.

12. The method of Claim 11, wherein the converting step includes:  
using a current-steering digital-to-analog converter (DAC) to provide differential current signals that represent the input signal; and  
using a current mode filter operating completely in the current domain to receive the differential current signals that represent the input signal, and to provide the input current-domain signal that is used in the up-frequency-converting step.